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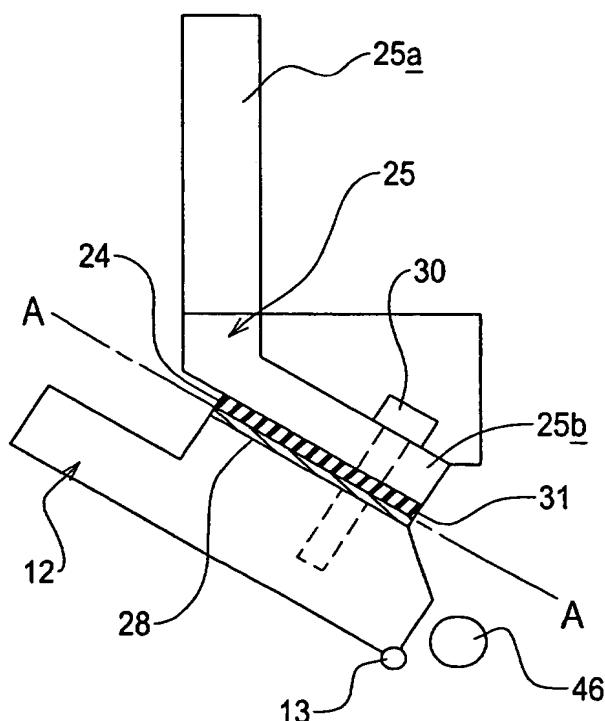
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- Published:**
— with international search report

[Continued on next page]

(54) Title: PRINTING APPARATUS AND METHODS



(57) Abstract: A printing apparatus (10) has at a printing station (11), a print head (12) with an array (13) of heating elements individually selectable by a computer controller (15), a feed path (16) for feeding carrier ribbon (18) through the printing station (11), the carrier ribbon (18) carrying a layer of thermally sensitive print medium, pixels of the thermally sensitive print medium being in use deposited on a print area of a substrate (20), by selectively energising the heating elements, as the substrate (20) and print head (12) are relatively moved, the apparatus (10) including a backing member (22) and the substrate (20) being positioned in use between the backing member (22) and the carrier ribbon (18), and wherein the print head (12) is mounted by amounting structure (25) for generally linear movement towards and away from the substrate (20), one of the mounting structure (25) and print head (12) including a projecting part which projects towards the other and at least during printing engages with the other of the mounting structure (25) and print head (12), and there being a resilient member (31) between the mounting structure (25) and the print head (12) which allows resiliently resisted movement between the mounting structure (25) and the print head (12) with the projecting part engaged with the other of the mounting structure (25) and print head (12) and there being at least one fastener (30) to couple the mounting structure (25) and print head (12) together.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

Int. Patent Application No
PCT/GB 03/03424

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B41J25/312 B41J33/04 B41J33/14 B41J2/325 B41J33/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B41J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 329 075 A (APPLEGATE STEVEN L ET AL) 11 May 1982 (1982-05-11)	1-4, 7-13, 19, 25, 26
Y	column 2, line 26 - column 4, line 22; figures 1-3, 6	5, 6
X	EP 0 361 826 A (SHINKO ELECTRIC CO LTD) 4 April 1990 (1990-04-04)	1-4, 7-13, 19, 25, 26
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X	US 5 576 751 A (WADA SATOSHI ET AL) 19 November 1996 (1996-11-19)	1-4, 7-13, 19, 25, 26
	column 4, line 29 - column 8, line 29; figures 3, 4, 7	
	- / - -	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

28 November 2003

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INTERNATIONAL SEARCH REPORT

Int al Application No
PCT/GB 03/03424

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 555 556 A (MARKEM CORP) 18 August 1993 (1993-08-18) column 6, line 11 - column 11, line 52; figures 3,6	1-4, 7-13,19, 25,26
Y	----- US 6 247 859 B1 (BUTCHER JAMES CHRISTOPHER) 19 June 2001 (2001-06-19) the whole document -----	5,6

INTERNATIONAL SEARCH REPORT

ational application No.
PCT/GB 03/03424

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-13, 19, 25, 26

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13,19,25,26

Problem: Accomodate misalignment of print head and adjust print pressure.

Solution: Provide resilient member as a spacer between printhead and print head mounting structure.

2. claims: 14,15,23,24

Problem: How to maintain a minimum relative speed between print head and substrate.

Solution: Moving the print head in a direction opposite to the direction of arrival of the substrate.

3. claims: 16-18,20-22

Problem: How to operate the printer bidirectionally with accurate ribbon movements.

Solution: Each of the take-up and supply spools are driven by a D.C. drive motor.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Patent Application No

Pat. No. GB 03/03424

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